EXAMPLE 63

5'-*O*-DMT-2'-deoxy-2'-methylene-5-methyl uridine-3'-(2-cyanoethyl-N,N-diisoproppyl) phosphoramidite

[0241] 2'-Deoxy-2'-methylene-3',5'-*O*-(tetraisopropyl disiloxane-1,3,diyl)-5-methyl uridine is synthesized following the procedures reported for the corresponding uridine derivative (Hansske, F.; Madej, D.; Robins, M.J. *Tetrahedron* (1984) **40**, 125; Matsuda, A.; Takenusi, K.; Tanaka, S.; Sasaki, T.; Ueda, T. *J. Med. Chem.* (1991) **34**, 812; See also Cory, A. H.; Samano, V.; Robins, M. J.; Cory, J. G. 2'-Deoxy-2'-methylene derivatives of adenosine, guanosine, tubercidin, cytidine and uridine as inhibitors of L1210 cell growth in culture. Biochem. Pharmacol. (1994), 47(2), 365-71.)

[0242] It is treated with IM TBAF in THF to give 2'-deoxy-2'-methylene-5-methyl uridine. It is dissolved in pyridine and treated with DMT-Cl and stirred to give the 5'-*O*-DMT-2'-deoxy-2'-methylene-5-methyl uridine. This compound is treated with 2-cyanoethyl-N,N-diisopropyl phosphoramidite and diisopropylaminotetrazolide. In a similar manner the corresponding N-6 benzoyl adenosine, N-4-benzoyl cytosine, N-2-isobutyryl guanosine phosphoramidite derivatives are synthesized.

EXAMPLE 63

Synthesis of 3'-*O*-4'-C-methyleneribonucleoside

[0243] 5'-*O*-DMT-3'-*O*-4'-*C*-methylene uridine and 5-methyl uridine are synthesized and phosphitylated according to the procedure of Obika *et al.* (Obika *et al. Bioorg. Med. Chem. Lett.* (1999) **9**, 515-158). The amidites are incorporated into oligonucleotides using the protocols described above.

EXAMPLE 64

Synthesis of 2'-methylene phosphoramidites

[0244] 5'-*O*-DMT-2'-(methyl)-3'-*O*-(2-cyanoethyl-N,N-diisopropylamine)-5-methyluridine-phosphoramidite, 5'-*O*-DMT-2'-(methyl)-N-6-benzoyl adenosine (3'-*O*-2-cyanoethyl-N,N-diisopropylamino) phosphoramidite, 5'-*O*-DMT-2'-(methyl)-N2-isoburytyl guanosine-3'-*O*-(2-cyanoethyl-N,N-diisopropylamino) phosphoramidite and 5'-*O*-DMT-2'-(methyl)-N-4-benzoyl cytidine-3'-*O*-(2-cyanoethyl-N,N-diisopropylamino) phosphoramidites were obtained by the phosphitylation of the corresponding nucleosides. The nucleosides were synthesized according to the procedure described by Iribarren, Adolfo M.; Cicero, Daniel O.; Neuner, Philippe J. Resistance to degradation by nucleases of (2'S)-2'-deoxy-2'-C-methyloligonucleotides, novel potential antisense probes. Antisense Res. Dev., (1994), 4(2), 95-8; Schmit, Chantal; Bevierre, Marc-Olivier; De Mesmaeker, Alain; Altmann, Karl-Heinz. "The effects of 2'- and 3'-alkyl substituents on oligonucleotide hybridization and stability". Bioorg. Med. Chem. Lett. (1994), 4(16), 1969-74.

[0245] The phosphitylation is carried out by using the bisamidite procedure.

EXAMPLE 65

Synthesis of 2'-S-methyl phosphoramidites

[0246] 5'-*O*-DMT-2'-S-(methyl)-3'-*O*-(2-cyanoethyl-N,N-diisopropylamine)-5-methyl uridine-phosphoramidite, 5'-*O*-DMT-2'-S(methyl)-N-6-benzoyl adenosine (3'-*O*-2-cyanoethyl-N,N-diisopropylamino) phosphoramidite, 5'-*O*-DMT-2'-S-(methyl)-N2-isoburytyl guanosine-3'-*O*-(2-cyanoethyl-N,N-diisopropylamino) phosphoramidite and 5'-*O*-DMT-2'-S-(methyl)-N-4-benzoyl cytidine-3'-*O*-(2-cyanoethyl-N,N-diisopropylamino) phosphoramidites were obtained by the phosphitylation of the corresponding nucleosides. The nucleosides were synthesized according to the procedure described by Fraser *et al.* (Fraser, A.; Wheeler, P.; Cook, P.D.; Sanghvi, Y.S. *J. Heterocycl. Chem.* (1993) **31**, 1277-1287). The phosphitylation is carried out by using the bisamidite procedure.

EXAMPLE 66

Synthesis of 2'-*O*-methyl-β-D-arabinofuranosyl compounds

[0247] 2'-*O*-Methyl-β-D-arabinofuranosyl-thymidine containing oligonucleotides were synthesized following the procedures of Gotfredson *et. al.* (Gotfredson, C.H. *et. al. Tetrahedron Lett.* (1994) **35**, 6941-6944; Gotfredson, C.H. *et. al. Bioorg. Med. Chem.* (1996) **4**, 1217-1225). 5'-*O*-DMT-2'-ara-(O-methyl)-3'-*O*-(2-cyanoethyl-N,N-diisopropylamine)-5-methyl uridine-phosphoramidite, 5'-*O*-DMT-2'-ara-(O-methyl)-N-6-benzoyl adenosine (3'-*O*-2-cyanoethyl-N,N-diisopropylamino) phosphoramidite, 5'-*O*-DMT-2'-ara-(O-methyl)-N2-isoburytyl guanosine-3'-*O*-(2-cyanoethyl-N,N-diisopropylamino) phosphoramidite and 5'-*O*-DMT-2'-ara-(O-methyl)-N-4-benzoyl cytidine-3'-*O*-(2-cyanoethyl-N,N-diisopropylamino) phosphoramidites are obtained by the phosphitylation of the corresponding nucleosides. The nucleosides are synthesized according to the procedure described by Gotfredson, C.H. *et. al. Tetrahedron Lett.* (1994) **35**, 6941-6944; Gotfredson, C.H. *et. al. Bioorg. Med. Chem.* (1996) **4**, 1217-1225. The phosphitylation is carried out by using the bisamidite procedure.

EXAMPLE 67

Synthesis of 2'-fluoro-β-D-arabinofuranosyl compounds

[0248] 2'-Fluoro-β-D-arabinofuranosyl oligonucleotides are synthesized following the procedures by Kois,P. et al., Nucleosides Nucleotides 12, 1093,1993 and Damha et al., J. Am. Chem. Soc., 120, 12976,1998 and references sited therin. 5'-*O*-DMT-2'-ara-(fluoro)-3'-*O*-(2-cyanoethyl-N,N-diisopropylamine)-5-methyl uridine-phosphoramidite, 5'-*O*-DMT-2'-ara-(fluoro)-N-6-benzoyl adenosine (3'-*O*-2-cyanoethyl-N,N-diisopropylamino) phosphoramidite, 5'-*O*-DMT-2'-ara-(fluoro)-N2-isoburytyl guanosine-3'-*O*-(2-cyanoethyl-N,N-diisopropylamino) phosphoramidite and 5'-*O*-DMT-2'-ara-(fluoro)-N-4-benzoyl cytidine-3'-*O*-(2-cyanoethyl-N,N-diisopropylamino) phosphoramidites are obtained by the phosphitylation of the corresponding nucleosides. The nucleosides are synthesized according to the procedure described by Kois,P. et